by Sano *et al.* of approximately 1,500 Myr is the expected result.

Second, this rock, which is essentially a quartzite, has no intrinsic capacity to form apatite by metamorphic reactions following diagenesis. Thus, the apatite present in this rock must be original (formed before 3,850 Myr) unless phosphate-bearing fluids were subsequently introduced metasomatically. Although no apatite has been recognized in the BIF that does not contain graphite inclusions, no apatites with graphite inclusions have been found in the immediately adjacent, encompassing gneisses^{1,6,7}.

Sano *et al.* are concerned that if "the apatites were formed during metamorphism, biogenic carbon could have been introduced". Again, given that the encompassing rocks do not contain graphitic inclusions with isotopically light carbon¹, this could not have occurred after 3,850 Myr.

"If these apatites were formed 3,800 Myr ago," Sano *et al.* allow, "graphite inclusions within grains of apatite have also experienced a thermal event of around 600 °C" (actually 400 °C; see <http://oro.ess.ucla.edu/sjm-nature.html>) "about 1,500 Myr ago". They posit that the "isotope composition of the carbonaceous inclusions might have been altered by the event". However, the extremely slow self-diffusion rates of carbon in graphite⁷ (less than 10^{-39} cm² s⁻¹ at 600 °C) precludes significant diffusive carbon-isotope exchange.

Could the isotopically light carbon ($\delta^{13}\text{C}$; 35‰) in the apatite inclusions¹ be abiogenic? Sano *et al.* seem to prefer a Rayleigh distillation mechanism that was previously⁸ raised to illustrate the unlikelihood of such a process occurring. However, such a process has not been documented in the geological record, and Sano *et al.* do not specify how abiogenic carbon of ($\delta^{13}\text{C}$ exceeding 10‰; ref. 9) could be fractionated by about 30‰ to mimic a biogenic signature. Under metamorphic conditions, the relevant mineral assemblage (quartz, magnetite, pyroxene, amphibole, pyrrhotite, apatite and graphite) coexists with H₂O-bearing fluid containing both CH₄ and CO₂ (ref. 10). The previous calculations⁸ did not consider the participation of CH₄, which mitigates against this type of isotope fractionation because it preferentially partitions ¹²C, leaving a residue that becomes isotopically heavier with time, not lighter¹¹. Thus, the role for Rayleigh fractionation proposed by Sano *et al.* is both improbable and unsupported by their Pb isotope data for apatite. Finally, Sano *et al.* imply that the rare-earth-element signatures of apatites can distinguish between a biogenic and abiogenic origin, but there is no basis for such a suggestion in this context.

In conclusion, the data reported by Sano *et al.* are not pertinent to the formation age of the host apatite and are not relevant to

the mode of origin or preservation of the isotopically light carbonaceous inclusions they contain. In our view, the occurrence of this geochemical association in rocks of sedimentary origin is best explained as the product of biological activity^{1,12} more than 3,850 Myr ago^{1,2}.

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Nicotine withdrawal and road accidents

Waters *et al.*¹ suggested that the effects of nicotine withdrawal increase the chances of an accident at work. The second Wednesday of March is 'No Smoking Day' (NSD) in the United Kingdom. If the 'accident effect' is real, increased numbers of other types of accident would be expected on NSD. I have investigated this possibility by using data from the UK national STATS19 accident reporting system², which records details of personal injury accidents occurring on public roads in which at least one

Figure 1 Average number of accidents in 1988–97 on Wednesdays around 'No Smoking Day' (NSD).

road vehicle, or a vehicle in collision with a pedestrian, is involved, and which becomes known to the police within 30 days of its occurrence. Damage-only accidents are not included. The date of the accident is also recorded.

I compared the average number of road accidents occurring over the past 10 years (1988–97) on NSD with the average for the Wednesday before and the Wednesday after NSD. Table 1 shows the means and standard deviations of these measures for NSD week and the weeks before and after it. Paired-sample Student's *t*-tests (one-tailed) did not indicate that there were significantly more accidents on NSD than on the previous Wednesday ($t = -1.36$, $P = 0.10$) or the following one ($t = -0.39$, $P = 0.35$).

A visual inspection of the data for the five Wednesdays before and after NSD (Fig. 1) shows no obvious indication that the effects of nicotine withdrawal on NSD led to an increased number of road accidents when compared with the other Wednesdays in February and March. The only feature to stand out is the decrease in accidents between the last Wednesday in February and the first Wednesday in March in 7 of the 10 years examined. No explanation for this effect has been established.

Similar analyses of the severity of accidents and the age and sex of the drivers involved also provide no evidence of an increased number of accidents on NSD.

Jackie Knowles

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Table 1 Average number of road accidents in 1988 to 1997

Day	One week before NSD		NSD week		One week after NSD	
	Average no.	s.d.	Average no.	s.d.	Average no.	s.d.
Monday	593.4	63.6	598.8	84.5	627.0	99.0
Tuesday	579.8	122.3	605.6	85.9	606.4	93.3
Wednesday	583.2	98.2	620.7	58.4	628.1	47.8
Thursday	655.3	106.5	605.0	61.5	639.0	85.9
Friday	712.1	70.3	719.0	67.3	781.3	90.0
Saturday	624.3	71.8	649.0	61.4	633.1	103.6
Sunday	453.3	61.7	502.9	60.8	488.3	77.8

s.d., Standard deviation.